

## DESCRIPTION

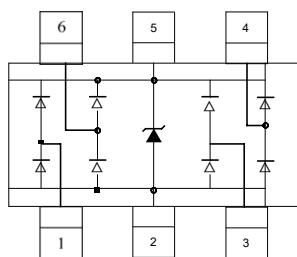
The KZC099-04S a low capacitance of 0.4pF maximum and operates with virtually no insertion loss to 1GHz. This makes the device ideal for protection of high-speed data lines such as USB 2.0, Firewire, DVI, and gigabit Ethernet interfaces. The low capacitance array configuration allows the user to protect four high-speed data or transmission lines. The low inductance construction minimizes voltage overshoot during high current surges. They may be used to meet the ESD immunity requirements of IEC61000-4-2, Level 4 ( $\pm 15\text{kV}$  air,  $\pm 8\text{kV}$  contact discharge).

This device has been specifically designed to protect sensitive components which are connected to high-speed data and transmission lines from overvoltage caused by ESD (electrostatic discharge), CDE (Cable Discharge Events), and lightning.

## ORDERING INFORMATION

- ✧ Package: SOT-23-6L
- ✧ Material: Halogen free
- ✧ Packing: Tape & Reel
- ✧ Quantity per reel: 3,000pcs

## PIN CONFIGURATION



## FEATURES

- ✧ Protects four I/O lines and one Vcc line
- ✧ Low capacitance
- ✧ Working voltages : 5V
- ✧ Low leakage current
- ✧ Low capacitance for high-speed interfaces
- ✧ No insertion loss to 2.0GHz
- ✧ Response Time is < 1 ns
- ✧ Solid-state silicon avalanche technology
- ✧ ROHS compliant

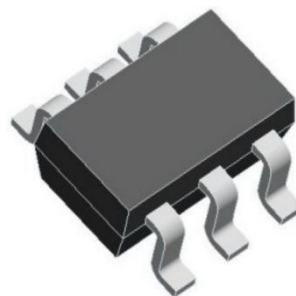
## MACHANICAL DATA

- ✧ SOT-23-6L package
- ✧ Flammability Rating: UL 94V-0
- ✧ Terminal: Matte tin plated.
- ✧ Packaging: Tape and Reel
- ✧ High temperature soldering guaranteed:  $260^{\circ}\text{C}/10\text{s}$
- ✧ Reel size: 7 inch

## APPLICATIONS

- ✧ Digital Visual Interface (DVI)
- ✧ USB 1.1/2.0/OTG
- ✧ IEEE 1394 Firewire Ports
- ✧ Notebooks & Handhelds
- ✧ Projection TV & Monitors
- ✧ Set-top box
- ✧ Flat Panel Displays
- ✧ PCI Express

## PACKAGE OUTLINE



### ABSOLUTE MAXIMUM RATING

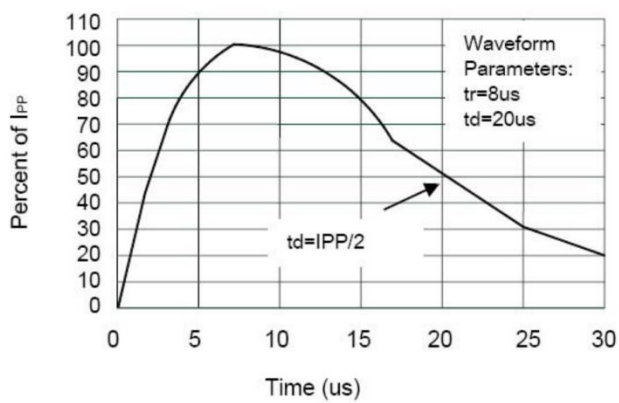
| Symbol    | Parameter                                                      | Value               | Units |
|-----------|----------------------------------------------------------------|---------------------|-------|
| $P_{PK}$  | Peak Pulse Power (8/20 $\mu$ s)                                | 150                 | W     |
| $I_{PP}$  | Peak Pulse Current (8/20 $\mu$ s)                              | 5                   | A     |
| $V_{ESD}$ | ESD per IEC 61000-4-2 (Air)<br>ESD per IEC 61000-4-2 (Contact) | $\pm 15$<br>$\pm 8$ | kV    |
| $T_{OPT}$ | Operating Temperature                                          | -55/+150            | . C   |
| $T_{STG}$ | Storage Temperature                                            | -55/+150            | . C   |

### ELECTRICAL CHARACTERISTICS ( $T_{amb}=25^{\circ}C$ )

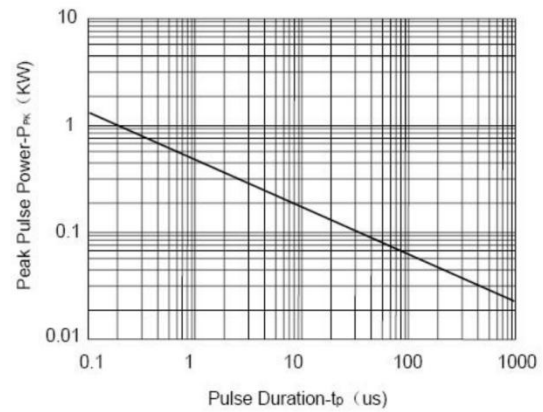
| Symbol    | Parameter                 | Test Condition                                       | Min | Typ | Max | Units   |
|-----------|---------------------------|------------------------------------------------------|-----|-----|-----|---------|
| $V_{RWM}$ | Reverse Working Voltage   | Any I/O pin to GND                                   |     |     | 5.0 | V       |
| $V_{BR}$  | Reverse Breakdown Voltage | $I_F = 1mA$<br>Any I/O pin to GND                    | 6.0 |     |     | V       |
| $I_R$     | Reverse Leakage Current   | $V_{RWM} = 5V$<br>Any I/O pin to GND                 |     |     | 1   | $\mu A$ |
| $V_F$     | Diode Forward Voltage     | $I_F = 15mA$                                         |     |     | 1.2 | V       |
| $V_{C1}$  | Clamping Voltage 1        | $I_{PP} = 1A, t_p = 8/20\mu s$<br>Any I/O pin to GND |     |     | 15  | V       |
| $V_{C2}$  | Clamping Voltage 2        | $I_{PP} = 5A, t_p = 8/20\mu s$<br>Any I/O pin to GND |     |     | 28  | V       |
| $C_{J1}$  | Junction Capacitance 1    | $V_R = 0V, f = 1MHz$<br>Between I/O pins             |     |     | 0.4 | pF      |
| $C_{J2}$  | Junction Capacitance 2    | $V_R = 0V, f = 1MHz$<br>Any I/O pin to GND           |     |     | 0.8 | pF      |

Note: I/O pins are pin 1,3,4,6.

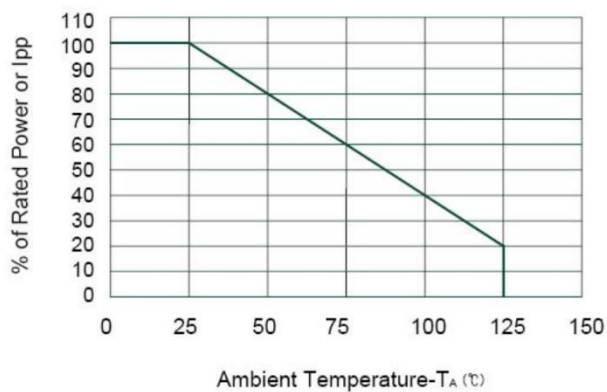
## ELECTRICAL CHARACTERISTICS CURVE



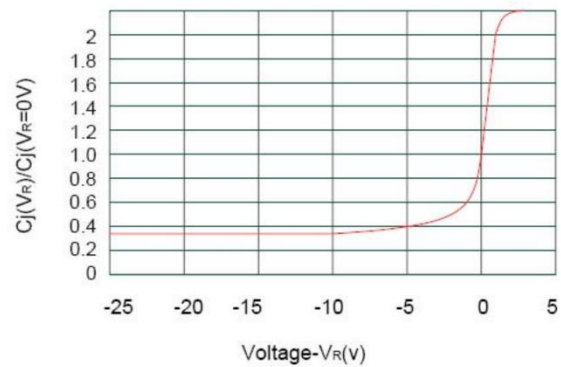
Pulse Waveform



Non-Repetitive Peak Pulse Power vs. Pulse Time

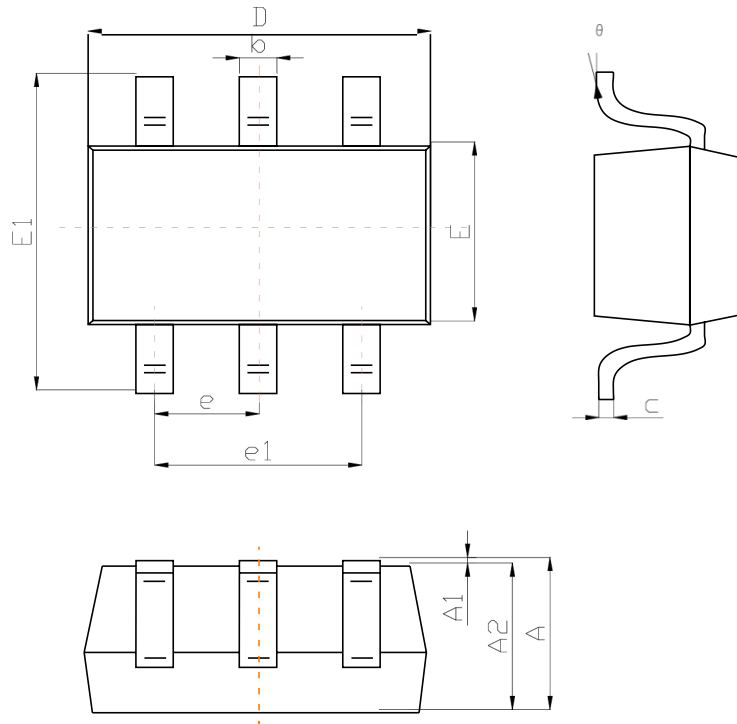


Power Derating Curve



Junction Capacitance vs. Reverse Voltage

**SOT-23-6L PACKAGE OUTLINE DIMENSIONS**



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1     | 0.000                     | 0.100 |                      | 0.004 |
| A2     | 1.050                     | 1.150 | 0.041                | 0.045 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 2.820                     | 3.020 | 0.111                | 0.119 |
| E      | 1.500                     | 1.700 | 0.059                | 0.067 |
| E1     | 2.650                     | 2.950 | 0.104                | 0.116 |
| e      | 0,950(BSC)                |       | 0.037(BSC)           |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.300                     | 0.600 | 0.012                | 0.024 |
|        | 0°                        | 8°    | 0°                   | 8°    |